

WHAT IS CLAIMED IS:

1. An exhaust gas purification system equipped, from an upstream side toward downstream side through which an exhaust gas flows, with a plasma reactor and a catalyst unit charged with a catalyst acting on NO<sub>x</sub> in said exhaust gas in this order, and equipped with a reducing agent supplying device to supply a reducing agent at an upstream side of said plasma reactor,

wherein said catalyst has an NO<sub>2</sub> adsorptive catalyst layer and an NO<sub>2</sub> selective reduction catalyst layer contacting the NO<sub>2</sub> adsorptive catalyst layer.

2. An exhaust gas purification system according to claim 1, wherein said NO<sub>2</sub> selective reduction catalyst layer is disposed on a surface of said catalyst, and said NO<sub>2</sub> adsorptive catalyst layer is disposed inside said NO<sub>2</sub> selective reduction catalyst layer.

3. An exhaust gas purification system according to claim 1, wherein said NO<sub>2</sub> adsorptive catalyst layer is a porous support to be made to support at least one kind of alkali metal, alkali earth metal, and rare earth metal; and said NO<sub>2</sub> selective reduction catalyst layer is a porous support to be made to support silver.

4. An exhaust gas purification system according to claim 2, wherein said NO<sub>2</sub> adsorptive catalyst layer is a porous support to be made to support at least one kind of alkali metal, alkali earth metal, and rare earth metal; and said NO<sub>2</sub> selective reduction catalyst layer is a porous support to be made to support silver.

5. An exhaust gas purification system according to claim 2, wherein said NO<sub>2</sub> adsorptive catalyst layer is stacked on an inner wall surface of narrow porosities of a support body with a plurality of the narrow porosities, and mass of said NO<sub>2</sub> adsorptive catalyst layer per unit volume of said narrow porosities

is not less than 50 g/liter and not more than 100 g/liter; and wherein said NO<sub>2</sub> selective reduction catalyst layer is stacked on said NO<sub>2</sub> adsorptive catalyst layer, and mass of said NO<sub>2</sub> selective reduction catalyst layer per unit volume of said narrow porosities is not less than 100 g/liter and not more than 250 g/liter.

6. An exhaust gas purification system according to claim 3, wherein said NO<sub>2</sub> adsorptive catalyst layer is stacked on an inner wall surface of narrow porosities of a support body with a plurality of the narrow porosities, and mass of said NO<sub>2</sub> adsorptive catalyst layer per unit volume of said narrow porosities is not less than 50 g/liter and not more than 100 g/liter; and wherein said NO<sub>2</sub> selective reduction catalyst layer is stacked on said NO<sub>2</sub> adsorptive catalyst layer, and mass of said NO<sub>2</sub> selective reduction catalyst layer per unit volume of said narrow porosities is not less than 100 g/liter and not more than 250 g/liter.

7. An exhaust gas purification system according to claim 3, wherein a silver support amount of said NO<sub>2</sub> selective reduction catalyst layer is not less than 1.5 mass percent and not more than 5 mass percent for the mass of the NO<sub>2</sub> selective reduction catalyst layer.

8. An exhaust gas purification system according to claim 4, wherein a silver support amount of said NO<sub>2</sub> selective reduction catalyst layer is not less than 1.5 mass percent and not more than 5 mass percent for the mass of the NO<sub>2</sub> selective reduction catalyst layer.

9. An exhaust gas purification system according to claim 5, wherein a silver support amount of said NO<sub>2</sub> selective reduction catalyst layer is not less than 1.5 mass percent and not more than 5 mass percent for the mass of the NO<sub>2</sub> selective reduction catalyst layer.

10. An exhaust gas purification system according to claim 6, wherein a silver support amount of said NO<sub>2</sub> selective reduction catalyst layer is not less than 1.5 mass percent and not more than 5 mass percent for the mass of the NO<sub>2</sub> selective reduction catalyst layer.

5 11. An exhaust gas purification system according to any one of claims 1 to 10, wherein a NO<sub>x</sub> selective reduction catalyst unit charged with a NO<sub>x</sub> selective reduction catalyst is disposed at a downstream side of said catalyst unit.

10 12. An exhaust gas purification system according to claim 11, wherein said NO<sub>x</sub> selective reduction catalyst is a porous support to be made to support silver and a silver support amount of said NO<sub>x</sub> selective reduction catalyst is not less than 1.5 mass percent and not more than 5 mass percent.